undp
WORLD DEVELOPMENT
SPECIAL REPORT
THE LEARNING GAP
Mongolia – Out of the Shadows
Tonga Tunes Up its Economy
JANUARY 1990

# WORLD DEVELOPMENT

VOL.3, NO.1

## SPECIAL REPORT
## THE LEARNING GAP

**No Time to Lose —** Without urgent help, nearly a third of the world's population will be without access to basic skills by the year 2000. By Lloyd Garrison 4

**Thailand — Reaching Eight Million Students by Radio.** By Mary Lynn Hanley 6

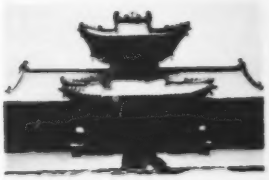
**Ghana — The Long Road Back from Despair.** By Colleen Lowe Morna 8

**Indonesia — Vocational Training for Millions.** By Mary Lynn Hanley 10

**Bulgaria — Preparing for the New Information Age.** By Mary Lynn Hanley 13

**Egypt — The Alexandria Library Rises Again.** By Lois Jensen 16

**Honduras — Where Even the Children Know the Meaning of Ecology.** By Peter Gall 20



COUNTRY PROFILE

**Mongolia — Out of the Shadows.** By Holly A. Ornstein 22

BUSINESS

**Tonga Tunes Up Its Economy.** By Cherie Hart 28

SPEAKING OUT

**"It's Time to Help the Invisible Revolution."** By Mario Vargas Llosa 30

Articles and photos may be freely reproduced so long as credit is given and tear sheets are provided to the Editors

**Director:**
J. Russell Boner

**Editor-in-Chief:**
Lloyd Garrison

**Design:**
Esther Kurtz, Director
Nieves Singian, Assistant
Maureen Lynch

**Associate Editors:**
Mary Lynn Hanley
Cherie Hart
Lois Jensen
Sid Kane
David Kinley
Ruth Massey
Emma Robson

**Editorial Assistants:**
Mila Feliciano
Jennifer Prince
Freweini Abebe

**Translations Manager:**
Fauvette van der Schoot

**Production:**
Linda Inocencio-Groux
Annie Straw
Afsaneh Djabbari
Danielle Strahl

**Circulation:**
Alison Walton
Francoise Gerber

**Distribution:**
Welde Hailemelekot

**Published by:**
Division of Information
United Nations Development Programme
One UN Plaza
New York, NY 10017

The boundaries and names shown on all maps do not imply official endorsement by the United Nations

***Cover:* Primary school in Zaire. Photo by James Sugar/Black Star**

# No Time to Lose

By Lloyd [illegible]son

For many children in the world's 41 least developed countries, the 1980s constituted a lost decade. If the 1990s are going to be any different, both the countries affected and the donors who assist them will have to seek radical new solutions.

Throughout the 1980s, many developing nations suffered painful cuts in education and teacher training as their governments grappled with falling commodity prices, rising debt costs and structural adjustment programmes that called for rigorous austerity measures. In Bangladesh, only one in five students entering the school system emerges literate. In rural Mali, there are only six textbooks per 100 students, and in seven out of 20 schools, no textbooks at all. "The number of children without access to any form of schooling is close to 100 million and growing yearly," says John Lawrence, human resources specialist with the United Nations Development Programme (UNDP). "If the crisis continues, nearly a third of the world's population will be without access to basic skills by the end of the century."

There is no doubt that development without education cannot be sustained. "We have seen neighbours achieve growth rates varying from three per cent in one country to seven per cent in another with similar investments," says Mahbub ul Haq, formerly Pakistan's Planning Minister who is now evaluating UNDP policies. "In each case, the difference has been made by human skills and enterprise, and by the institutions responsible for producing them."

By the start of 1989, UNDP had committed US$181 million to over 250 educational projects, ranging from support for roving teachers among Nigeria's nomadic herdsmen to Indonesia's concerted efforts to provide skills training to meet the nation's burgeoning

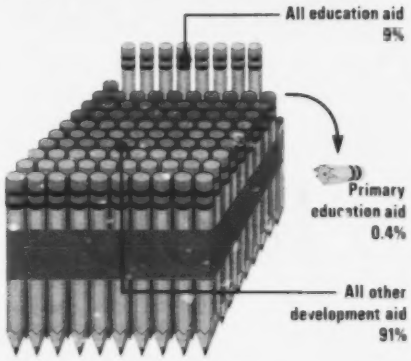
industrial growth. Yet, in recent years, both local government and donor funding for education has declined while the need to increase support for learning at all levels has been steadily rising. Which is the main reason why numerous chiefs of state, government ministers and heads of UN agencies have been drawn to the March 6-9 "World Conference on Education For All" in Thailand's new Jomtien convention centre outside Bangkok.

The conference promises to break new ground in several respects. First, those heads of state and ministers of planning and finance were invited because boosting government spending for education requires taking hard political and budgetary decisions. "We don't have trouble convincing ministers of education that education is important," says Colin Power, Assistant Director-General for Education at the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Paris. "We do have trouble convincing ministers of finance to part with more money for textbooks and schools."

Another departure is that the whole issue of education will be tackled by experts who often differ and seldom meet. In fact, the conference is sponsored by no fewer than four UN agencies — UNESCO, UNDP, the World Bank and UNICEF. "For the first time," says Mr. Power, "UN agencies will be working to reinforce each other instead of operating separately as they have in the past — often in competition or in ignorance of one another."

Indeed, the conference could mark the beginning of a trend toward increased co-operation among agencies committed to the concept of "integrated development," which attempts to apply a wide range of inter-related responses to a problem. In Jomtien, UNESCO will see to it that adult education is not forgotten. UNICEF will insist that children be provided with access to clean water and adequate nutrition so that they can stay healthy enough to be teachable. In urging governments to divert more money for primary schools, the World Bank will point to studies showing that bringing literacy to farmers led to a nine per cent increase in agricultural production. And UNDP will stress integrated human resources development, pointing out, for example, that literacy for women leads to lower birth rates, fewer mouths to feed and eventually to fewer adults joining the growing ranks of the jobless in regions where over-population and unemployment are rife.

**Development Assistance 1981-1986**




SOURCES: OECD, UNESCO, World Bank

The conference will also enable developing countries to field innovative ideas of their own. Pakistan will explain how it increased spending on education and health from nine per cent of total government expenditure in 1980 to over 14 per cent in 1986, largely with funds saved from eliminating subsidies and selling off money-losing state-run enterprises. "Brazil has over 300 projects coping with the problem of child labour, but nobody knows about them," says Jacques Hallack, who directs the International Institute of Educational Planning in Paris. Jomtien should change that lack of knowledge.

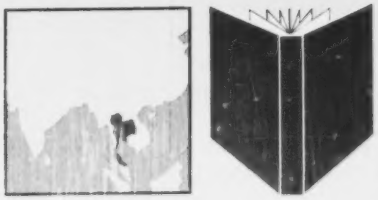
There is no shortage of possible solutions, as amply revealed in a 234-page report commissioned by UNDP called *Education and Training in the 1990s*. The report includes studies showing that radio can serve as an efficient and cost-effective teaching tool, and that the use of correspondence courses, computers, teleconferencing and educational television also offer promise. "A radio transmitter reaching millions of listeners through hundreds of radios," says the report, "involves equipment costing less per listener than the price of a pencil."

Radio's ability to attract and hold the interest of over six million Thai school children is spelled out in Mary Lynn Hanley's report from Bangkok on page 6. It is one of six case studies on the changing face of education around the world — including how a new UNDP-aided primary school curriculum is helping to save the forests of Honduras, and how students learn to problem-solve using computerized robots in 30 experimental schools in Bulgaria.

Such widely differing delivery systems will be among scores of new approaches to education debated in Jomtien. While many are cost-effective, Mr. Power estimates that meeting Bangkok's ambitious goals — 80 per cent literacy for all 14-year-olds by the year 2000 — could cost $45 billion. It hardly seems too much to ask. But even achieving 80 per cent literacy will require doubling today's education budgets in developing nations as a whole. Clearly, financing such an effort will require some critical choices for both donor countries attempting to stretch their aid budgets in many directions — including new demands for technical assistance from Eastern Europe — and developing countries that have few resources to spare but much to gain from a renewed assault on meeting basic learning needs. The road to Jomtien marks just a beginning. ■



READEX FICHE



THAILAND

# Reaching Eight Million Students by Radio

By Mary Lynn Hanley

**Bangkok, Thailand** — The sixth grade boys and girls, neatly dressed in clean white shirts and grey pants or navy blue skirts, troop into a large, airy classroom of Bangkok's Ban Bang primary school for their English lesson. As they scramble noisily to their seats their teacher adjusts the dials of a large box radio, bypassing stations blaring rock music.

At precisely 2.00 PM, a pleasant male voice cuts through the din in the classroom. The pupils listen attentively. "What work does this woman do?" the voice asks in perfectly-accented English. Picking up a pointer, the teacher approaches a visual aid board and points to a drawing. There is a carefully calculated pause to give the children time to repeat the question. Then an equally agreeable female voice says, "She's a nurse," as the teacher points to the English word "nurse" under the picture and the children repeat the answer.

Down the hall a half hour later, first graders listen to spritely Thai melodies coming from a radio in their music class. Guided by their teacher, they sing along, join hands and move in a circle to the tunes.

Similar scenes are being enacted in over 50,000 classrooms all over Thailand, where radio has become a standard tool for primary and secondary teaching as well as adult education. The Thais are continuing to perfect their educational broadcasting skills, developed with six years of technical assistance from the United Nations Educational, Scientific and Cultural Organization (UNESCO) funded by the United Nations Development Programme (UNDP).

"Radio is a very good tool to standardize teaching," says Napa Bhongbhibhat, a Deputy Director-General in Thailand's Ministry of Education. "First of all it's inexpensive. Secondly, it's the only thing that can penetrate the whole country." Radio in the primary schools is used in all courses in the curriculum. In secondary schools, it is used most extensively for language, math and music classes.

Ms. Napa estimates that eight million people listen to the educational radio programmes produced by the Ministry of Education. "Our biggest audience is six million primary school children," she says, "but even if we only reach 100,000 persons we achieve economy of scale."

In fact, the development of educational radio is the most ambitious media project ever undertaken in Thailand, and international assistance has enabled it to take a quantum leap forward. Between 1979 and 1985, primary and secondary school broadcasts were extended from 20 to all 73 of Thailand's provinces. Enrolment in the in-service teacher training programme increased by over 116 per cent and continues to be especially helpful to teachers in remote areas. "We don't

**Radio commands the attention of this sixth grade English class.**

UNDP photos by Mary Lynn Hanley

**Thailand is now moving into educational TV.**

have a shortage of teachers but we do have a shortage of quality teachers," says Ms. Napa. "We are aiming in particular to narrow the gap in the quality of education between the rural and urban areas."

An independent study has shown that the use of radio in Thailand "has enabled teachers to handle more grades and significantly improved the quality of instruction and student achievement." Similar results using radio have been achieved in Nicaragua, Mexico, the Dominican Republic, China and Kenya. In Malawi, radio was used to train farmers in new agricultural techniques at costs 3,000 times cheaper per hour of contact than face-to-face extension services.

While Thailand has become a role model in the use of radio, it was not always so. In the 1970s the country had one of the most advanced systems of education among the developing countries, but chances of enjoying its full benefits remained unequal. While well over 80 per cent of the seven-year olds entered primary school, less than 30 per cent went on to secondary school, and fewer than four per cent made it through grade 12. In 1975, 45 per cent of the secondary school pupils were from Bangkok, which contained only ten per cent of the country's total population. In 1982 more than ten per cent of all teachers had no basic certificate of education, and 25 per cent lacked the Secondary Grade Teacher's Certificate.

To overcome these growing weaknesses, the Royal Thai government in 1979 launched a US$70 million multi-purpose education project backed by a World Bank loan. A total of $29 million was earmarked to strengthen radio education, which Thailand had introduced some 20 years earlier.

Ninety per cent of Thailand's populated areas are now covered by the 11 stations of the National Educational Radio Network (NERN), which broadcasts 18 hours a day, from 5:30 AM until 11:30 PM. Eight hours of each day are allocated to the Ministry of Education. Of these, 25 1/2 hours are used for broadcasts to primary and secondary schools. Another 20 hours are taken up by courses for adults. The remaining 10 1/2 hours are designed to upgrade teaching skills. The rest of NERN's air time is used by such institutions as the Ministry of Health and the Ministry of Agriculture to give advice on topics ranging from how to avoid AIDS to proper maintenance of farm machinery.

The Ministry of Education has provided 50,000 radio sets to Thai schools and expanded its Centre for Educational Technology (CET) in Bangkok, where most of the radio programmes are produced. Complementary technical assistance from UNESCO, for which UNDP provided $1.5 million between 1980 and 1985, helped the Thais upgrade educational broadcasts and back-up materials, and to become expert in operating and maintaining the new equipment.

Keeping up with modern technology, Thailand is now moving into educational television. Two years ago the government launched Channel 11, a public broadcasting station that devotes at least 50 per cent of its air time to education. The Ministry of Education is committed to providing 19 hours of quality programmes per week and has allocated roughly $8 million between 1987 and 1991 to expand CET's TV production facilities. Technical assistance and training are coming from UNDP and UNESCO.

But TV's impact is still limited. For now, the voice asking "What work does this woman do?" will continue to reach the pupils in Ban Bang and millions like them in Thailand via the radio. ■

GHANA

# The Long Road Back from Despair

**By Colleen Lowe Morna**

**Accra, Ghana** — Wedged between Ghana's capital city, Accra, and its industrial satellite, Tema, Nungua Secondary School in many respects reflects the turmoil through which education in Ghana has passed.

Once this was one of the country's better schools. It had a fine faculty, motivated students and modern facilities. But then Nungua's high standards plummetted during Ghana's economic decline, which reached a low point in 1983. Today it is one of several schools starting to benefit from a major restructuring exercise partially funded by the World Bank, with administrative support from the United Nations Development Programme (UNDP). "We hope to restore the conditions prevailing here when the school was at its best," says Nungua headmaster Primus Dzitrie, who oversees the school's 720 students.

The story of this school, which is surrounded by the homes of fishermen overlooking the South Atlantic, is a reminder of the traditional high regard with which Ghanaians hold education. According to a 1985 brochure commemorating Nungua's silver jubilee, the school was founded by Quaye Nungua, when his son had to leave Presbyterian, one of Accra's oldest secondary schools, to be installed as chief. Nungua decided to build a school where his son could complete his education as well as attend to his new duties.

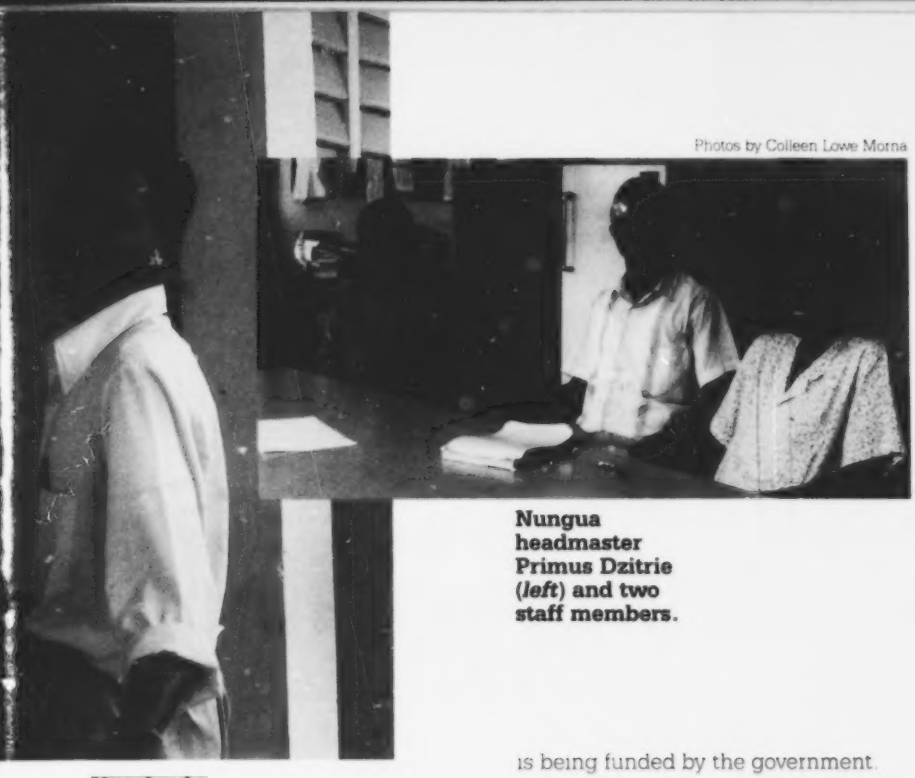
Founded in the heady post-independence days when Ghana achieved a literacy rate of 65 per cent, Nungua soon became an accredited government-sponsored secondary institution. At its peak, the school offered music, commerce, book keeping and shorthand alongside rigorous academic courses. It also boasted an active debating society, current affairs club and creative writing club producing a magazine called "The Nunsec Clanon." But all these petered out in the succeeding years.

Nationwide, a combination of inappropriate domestic policies, deteriorating commodity prices, drought and the forceable repatriation of one million Ghanaian workers from Nigeria in the early 1980s saw food production fall by 30 per cent, export earnings halve and the annual inflation rate climb to 123 per cent by 1983.

Spending on education dropped from twenty dollars per capita in 1972 to one dollar per capita in 1983. "Most children then had no textbooks or exercise books," recalls Education Minister K.B. Asante. "Buildings and desks were in a state of disrepair. Enrolment levels declined to the extent that two-thirds of today's adult population is now illiterate."

At Nungua, continual budget cuts necessitated a trimming of extra curricular activities. "The first thing you cut are subjects like music," says Mr. Dzitrie. "You concentrate on exam subjects and have to close your eyes to

Photos by Colleen Lowe Morna



**Nungua headmaster Primus Dzitrie (*left*) and two staff members.**

**New books bring smiles to Ghanaian students in Accra.**

shortages of furniture, electrical fittings and sports equipment."

Agnes Osei-Kissi, a parent and commerce graduate who was cut from her government job and now hawks rubber shoes by the roadside, explains that there is still a measure of prestige associated with education in Ghana's urban areas. "I would like my daughter to read well and become a doctor, not a trader like me," she says. Yet Ms. Osei-Kissi, like many other parents, is anxious about what kind of education her daughter is getting.

This is at the heart of the three-year-old "Education Sector Adjustment Programme" being implemented by the government alongside an IMF and World Bank-sponsored economic reform programme aimed at putting Ghana back on the road to prosperity. The World Bank has advanced US$34.5 million for an educational reform exercise. UNDP has provided $1,410,000 to the Ministry of Education to carry out planning and evaluation of the project. While overseas donors have contributed another $12 million, the bulk of the $463 million educational reform package is being funded by the government.

As Ghana's Deputy Secretary for Education, Esi Sutherland Addi points out, the restructuring exercise aims to "reverse the whole decline of the education system in the late 1970s." Apart from cost-cutting measures at the university level, the Ministry of Education has sought to clean house and prevent massive losses of funds through corruption. A key element at the lower levels has been a reduction of pre-university education from a wasteful 17 years of study to a more normal — and economical — 12 years. This is being augmented by a programme to retrain teachers whose qualifications have slipped in recent years, as well as introduce more vocational subjects.

The provision of books and equipment, necessary to support the revised curriculum for secondary schools, represents about one-fifth of the programme's costs. The rest is largely being spent on building repairs and upgrading teacher training.

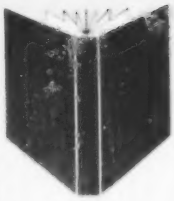
The effects are starting to be felt at a grassroots level. Nungua now offers a choice of art, science and business courses. For the first time in years the school has a full contingent of trained staff and received a slight increase in its budget last term. Toilets at the school are now working. New books are arriving. Similar improvements are taking place in secondary schools throughout the nation.

Acute problems remain. According to science teacher Chris Ayim, there is a shortage of lab equipment. Art teacher Eddie Akeita bemoans the fact that he has been trying to teach his students weaving without a loom, and Mr. Dzitrie says he could use four times his current budget to really bring the school up to its old standards.

But compared to the early 1980s when the senior class either failed or got the lowest third class pass, a third of last year's class either got distinctions or first class passes. "At least we have the minimum tools to work with," says school headboy Adjetey Nash, who hopes to become a doctor. "Now, with hard work, it is possible to get ahead." ■

---

*Colleen Lowe Morna is a Zimbabwean free lance journalist based in Harare.*



INDONESIA

# Vocational Training for Millions

## By Mary Lynn Hanley

**Jakarta, Indonesia** — With a population of 176 million growing by 2.1 per cent annually, Indonesia has more than two million new job seekers flooding the work force each year, and the nation faces Herculean problems in providing adequate vocational training. To appreciate these needs, one has only to visit East Java, the country's most densely populated area. The region's industries, in which petrochemicals, mechanical engineering and food processing predominate, require an ever-increasing influx of trained employees. Yet there are more than 300,000 unemployed in East Java — mainly because of a shortage of training facilities.

To close this gap, the Indonesian government, with the help of the United Nations Development Programme (UNDP) and the International Labour Organisation (ILO), has set up the East Java Manpower Development and Training Project. Based in the industrial port city of Surabaya, it is the largest UNDP-supported endeavour in Indonesia and also the biggest technical assistance project in the world for the ILO. The government considers it important enough to augment UNDP's US$345,600 grant with a contribution of $7.3 million, of which $7 million is from a World Bank loan for manpower development and training.

Chief Technical Adviser A. Montesinos' task is to co-ordinate the training activities of more than 2,000 government, private-sector and non-governmental organizations in East Java. "We have to bring together several Ministries which conduct training, as well as 700 or 800 licensed private training organizations," says the Peruvian national, who has been with ILO for 18 years. The project is expanding on the achievements of the Skill Development Centre, an earlier ILO-executed project for which UNDP provided $1 million. The Centre was set up to design training systems which could be reproduced throughout Indonesia.

While Mr. Montesinos and his colleagues tackle the general training needs of East Java, other organizations are addressing the problems of particular groups throughout the country, such as rural women and the disabled.

Women engage in many occupations in Indonesia. They are teachers, social workers, factory employees, government officials and engineers. Still, after grade six, when free universal compulsory education ends, more boys than girls continue their schooling, and the gap widens at the university level.

In the rural areas, where more than 70 per cent of Indonesian women live, cultural traditions that favour early marriage and frown on work outside the home limit women's opportunities for advancement. Over 37 per cent of rural women marry before the age of 16, and while this usually means the end of their education it does not stop their need for income. As they lack knowledge and skills, their job possibilities are frequently limited to low-paid, back-breaking tasks. Now, however, many women are taking advantage of new training opportunities to become self-employed, working from home or with groups of other women.

In the village of Sulang on the island of Bali, Wayan Rija used to spend her days shoveling stones in a gravel pit under the searing tropical sun, working 11 hours a day for RP 1,000 (about 60 US cents). Now Ms. Rija is earning more and working fewer hours as a weaver, producing two metres of sturdy patterned cotton cloth a day. With 22 other women, she received training and obtained a loom and raw material through a UNDP-assisted project that so far has helped more than 1,850 women set up cottage industries in a dozen villages.

In other villages women's groups have been organized for the production

**Shoveling stones is a hard way for Sulang women to make a living.**

UNDP photos by Mary Lynn Hanley

**Women trained as weavers can earn money on looms at home.**

of clothing, batik (printed cotton cloth), palm sugar, plaited bamboo products, roof tiles, silk fabric and embroidered articles. Additional training is being extended to women in 98 more villages through UNDP's contribution of $776,000, supplemented by a $1 million grant from The Netherlands.

Women in the fishing villages of Java's Sukabumi district are also working at home. UNDP has helped these women and others in four rural villages band together in small production groups. Their training includes courses in management and book keeping, and they are producing fish meal, banana chips, cassava flour and pineapple jelly.

Although the groups reinvest a share of their profits, the women universally express a need for more capital. Credit facilities are therefore being set up, and grants from the UN Development Fund for Women and the UN Population Fund will soon extend credit and training activities to seven more districts.

Another disadvantaged group being helped by UNDP-assisted programmes is the disabled. According to Soetadi Mertopuspito, Director-General for the Development of Social Rehabilitation in Indonesia's Ministry of Social Affairs, over three per cent of Indonesians — 5.5 million people — suffer a serious disability. Of this total, roughly 28 per cent are blind, 26 per cent are physically disabled, 13 per cent have a mental disability and ten per cent have a hearing impairment. The rest have chronic diseases such as leprosy.

**Orthopaedic problems do not deter metalwork trainees at the Dr. Soeharso Centre.**

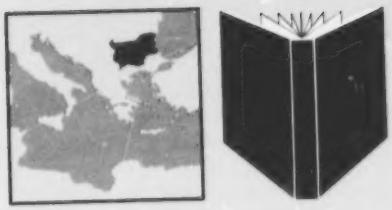
Training these people to lead productive lives presents a special challenge. Mr. Mertopuspito emphasizes that disabled children are not exempt from compulsory education. While some are able to attend mainstream schools, the government operates over 200 special schools for students with disabilities. One of the oldest, the Rehabilitation Centre for the Blind in Bandung, opened its doors in 1901 and has kept operating under successive Dutch, Japanese, British and Indonesian regimes. Here, school-age children aged six and up receive basic education while people 18 to 35 years old learn such skills as massage (especially appropriate for the blind), brush and broom-making, handicrafts production and farming. Classes in Braille and music are also available.

For young men and women with orthopaedic disabilities there is the Dr. Soeharso Rehabilitation Centre for the Disabled in Central Java, which receives assistance from UNDP and ILO. Most of the 285 trainees currently in residence are victims of accidents, polio or congenital diseases. They have come to the Centre for six to eight months of training to learn skills they can practise when they return to their villages. An example is Nox Nurmaidih, who suffers, as a result of a birth defect, from a badly deformed leg and a withered left hand. She is taking a course in tailoring. After training, she plans to return to her village in the western part of the island and open her own business. Other skills taught at the Centre include hair dressing, radio repair, metalwork, carpentry, auto repair, and production of artificial limbs and other orthopaedic devices.

According to Mr. Mertopuspito, Indonesia takes a three-pronged approach to helping the disabled. Up to 10,000 people a year benefit from rehabilitation services offered at 33 government centres such as the Dr. Soeharso Centre, and 57 centres run by non-governmental organizations and subsidized by the government. Others take advantage of community-based services the government has been promoting. Finally, industries are encouraged to employ the disabled once they have been trained.

Through the community-based programme, for which UNDP has funded over $1.4 million worth of ILO technical co-operation, disabled people who return to their communities with newly acquired skills are assisted in forming small business groups. The managers of these groups are trained in marketing, production and management. Some 200 community centres are now providing such services and a mobile rehabilitation unit is reaching other more remote locations. "We have 3,094 disabled business groups in the villages," says Mr. Mertopuspito. "Each group has from five to ten people. This means that 20,000 disabled people already have their own businesses — and their own income."

Perhaps the most demanding task faced by the Ministry of Social Affairs is the vocational rehabilitation of former leprosy patients. According to Mr. Mertopuspito, even when they are cured and trained, owing to deep-seated "leprophobia" they often remain outcasts in their own societies. "Our priority is to send them back to their communities or to settle them where they have cultural and language ties," he says. "But if this cannot happen we help them find new lives." In fact, leprosy settlements have been set up in 17 provinces — yet another indication of Indonesia's efforts to provide all its citizens with training for productive lives. ■



BUL·GARIA

UNDP photo by Mary Lynn Hanley

# Preparing for the New Information Age

**Computer classroom teacher checks students' solution to geometry problem.**

**By Mary Lynn Hanley**

**Sofia, Bulgaria** — Radoslav Rislavkondagov puzzles over the florescent green shape lighting up the screen of his micro computer in the secondary school classroom of the Vladimir Bashev school in Sofia, Bulgaria. Getting an idea, he presses a few keys to solve the geometry problem before him. His 15 classmates work at their own computers, independently or with a partner. Their teacher moves through the classroom, observing her students' work and encouraging them.

In another part of town, at the Indira Gandhi school, teenagers Ekaterina Christova and Kamelia Georgieva are using a computer to build a tower out of blocks. At their command, a replica of an actual factory robot, connected to their computer, is piling one plastic cylinder upon another. Their classroom resembles a miniature hi-tech production line. There are robots for arc welding, wood processing and lathe operation. The "hands" of one device grasp and release as the computer directs. Another robot is activated by the human voice. The students are learning to develop, debug and monitor programmes to control the little automatons.

"Those are exact replicas of the most common robots in the world, but smaller, safer and cheaper," says Nedko Shivarov, Deputy Director of the Institute for Industrial Cybernetics and Robotics, which has developed replicas, as well as all kinds of larger robots for Bulgarian industries. The Institute has been helped with fellowships, experts and equipment from the United Nations Development Programme (UNDP) and the United Nations Industrial Development Organization (UNIDO), and continues to work with these agencies on the creation of a training and consultancy centre.

The students manipulating robots are part of a ten-year-old educational experiment underway in 30 elementary and secondary schools that are using state-of-the art technology to train people for the new information age. This programme receives UNDP support through the United Nations Educational, Scientific and Cultural Organization (UNESCO).

"It doesn't do much good for students

UNDP photos by Mary Lynn Hanley

to endlessly practise multiplication exercises in this age of pocket calculators," says Professor Ivan Stanchev, Director of Bulgaria's Research Centre in Educational Informatics, which has been set up with the UNDP and UNESCO assistance. "They need to understand the logic of the system and use the tools available for calculations."

This philosophy is the basis for the new educational system Bulgaria is introducing in its experimental schools. Designed to prepare children for the world of hi-tech information systems and robots, it views the computer as an extension of the human mind.

In contrast to the other 1,470 schools in this country of nine million people, the 30 experimental schools do not use the classical curriculum in which math, language and other subjects are taught as separate disciplines. Rather, subjects are integrated into three units: "Language and mathematics," which includes reading and writing; "Nature," which embraces all of the sciences, and "Society," which deals with the development of human civilization, including arts and culture, and is intended to develop open-minded citizens ready to live in a peaceful, pluralistic world.

The new system emphasizes learning by doing instead of allowing children to remain passive while they are fed a large body of information in segmented subject areas. Students master principles applicable to numerous topics and become equipped for further independent study using new information technologies. "The idea is to show that we are living in a common world, and that everything is connected," says Professor Stanchev. "The main problem is to recognize these connections." He maintains that people educated in this way will be more open and self-assured, have more confidence in their ability to control their environment, and be ready to accept challenges and make decisions.

Pupils begin elementary computer programming as early as the age of nine. They use the Bulgarian version of the internationally accepted LOGO computer language to manipulate miniature trucks, cranes, houses and other toys they build with construction sets. Working in groups, the children are introduced to the principles of mechanics and physics while they learn skills of co-operation.

"With LOGO the children teach the computer, not vice versa," says Evgenia Sendova of Bulgaria's Institute of Mathematics, who is helping to introduce the new system. She explains that computers are not used to replace or supplement the teacher as a giver of information as is the case with traditional computer aided instruction (CAI) programmes. Instead, they help children acquire logical and analytical skills by continually posing questions which prompt them to break down a concept into its component parts. As an example, she cites an exercise in which the child thinks of an animal and the

**Students programme computerized robots which are exact miniatures of factory models.**

computer tries to guess what it is by asking the child to specify whether it has bones, fur, four legs, and so forth. "The children feel that they enrich the experience of the computer," says Ms. Sendova.

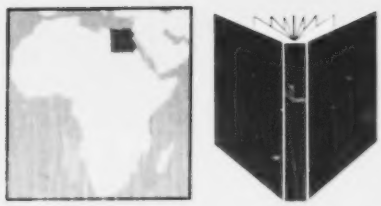
Professor Stanchev feels that Bulgaria's unique contribution to computer-aided learning lies in its integration of informatics and mathematics. "With traditional CAI systems the computer controls how you solve the problem and checks your mistakes," he says. "There is not only one way to solve a problem. That's why we started by creating an environment in which the students can work, but not prescribing how they should work. Let them decide themselves how to solve the problem."

Special training is provided for computer classroom teachers who are already competent in their respective fields. About 1,000 of Bulgaria's 30,000 teachers have thus far received this training. Research for the programme is carried on at the Lenin Higher Institute of Mechanical and Electrical Engineering in Sofia. Twenty computer specialists are developing software for educational informatics, for while Bulgaria produces its own Pravetz personal computers, it does not yet make the specialized software required by the experimental schools. Programmes are also being developed for vocational training in various fields, such as metalwork and electronics.

Since 1985, Bulgaria has organized three international conferences on "Children in an Information Age," bringing together specialists in computer-aided education from all over the world to share experiences. Especially close ties have been established with the Hueneme School District in Port Hueneme, California, a pioneer in the development of the "Smart Classroom," which integrates micro computers with video and other electronic media. Using all the latest communications technologies, the Hueneme system starts five-year-olds on computers and has reached the point where it can custom-design instructional programmes for individual students. Last September, ten Bulgarian students visited Port Hueneme for a two-week look at California's innovations. In October, ten Port Hueneme students paid a return visit to Sofia, where they were especially interested in Bulgaria's work on robotics.

Seeing Hueneme's facilities spurred the Bulgarians to take the next step by introducing "inter-active video" into the experimental schools' classrooms. In the most up-to-date systems, laser technology makes it possible to call up and control video images by computer. This opens up vast new possibilities for learning by enabling students to work with photographic images in addition to the abstract graphics the computers can produce. The Lenin Institute is already working with inter-active video with equipment provided by UNDP.

Like most students in the experimental schools, Radoslav, Ekaterina and Kamelia give their computer classes rave reviews. Many pupils are considering computer programming careers. Regardless of their future professions, Professor Stanchev and Ms. Sendova are betting that the education they are getting will well equip them for whatever the new information age may demand. ■




**By Lois Jensen**

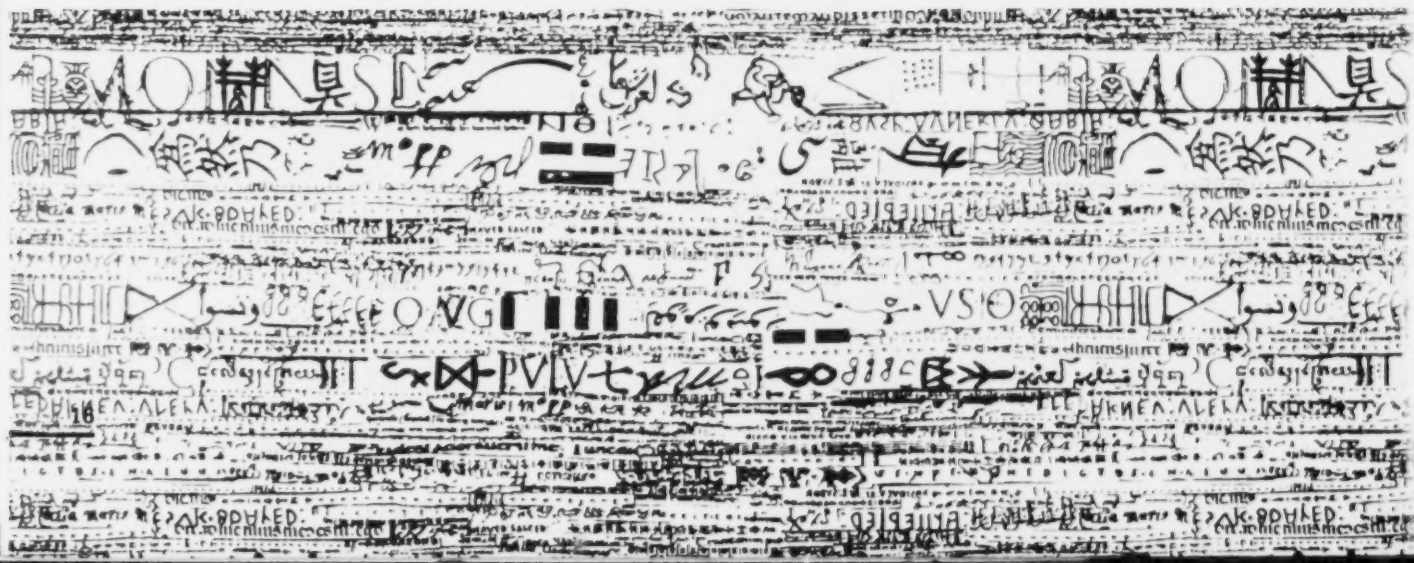
# The Alexandria Library Rises Again

**Alexandria, Egypt** — Alexander the Great was only 25 when he conquered Egypt. Descending the Nile to the coast of the Mediterranean Sea, he ordered his architect Dinocrates to transform the small fishing town of Rhakotis into a magnificent Greek metropolis. The city was named Alexandria.

Dead at age 33, Alexander would never know that the city he inspired in 322 B.C. was to flourish for over three hundred years as the most learned place on earth. One of its glories was its Mouseion, or "Temple of the Muses," which besides an observatory, zoo, botanical gardens and debating rooms, contained the greatest library of the ancient world. It was here that man first surmised that the earth was round and revolved around the sun, and here that some of the most renowned Greek and Roman scholars came to prove their intellectual mettle, to solve problems, conduct research, teach and write.

Within two generations, the "Mother" library contained over half a million papyrus scrolls. A "Daughter" library housed another part of the growing collection, which was built up through transfers from the Athenian Mouseion and by confiscating all manuscripts that entered Alexandria's harbour by ship, which were then systematically copied and translated into Greek. The library's ultimate goal was to collect the "books of all the peoples on earth," and was the first in history to catalogue its entire collection.

The reason for the disappearance of the ancient library remains conjectural. Some scholars believe that a portion of it was destroyed by fire at the time of



Julius Caesar's siege of Alexandria in 48 B.C. The final destruction is thought to have occurred in 391 A.D. during an attack by Christians on the pagan Temple of Serapis, where the Daughter library was housed.

Today a modern re-creation of the Alexandria Library is planned at the site of the former royal quarters and ancient library along the city's beautiful harbour. With funding from the United Nations Development Programme (UNDP), and in co-operation with the United Nations Educational, Scientific and Cultural Organization (UNESCO), a worldwide competition was launched in 1988 for the new library's design. The judging was supervised by the International Union of Architects.

Last September, first prize was awarded to Snohetta Arkitektur-Landskap, a Norwegian firm whose ten-member team, all in their late 20s or early 30s, included architects, graphic designers and a landscape artist from Argentina, Austria, Egypt, the Federal Republic of Germany, Norway, and the U.S. The new library's shape is bold and simple — a tilted circle, inclined toward the sea, partly submerged in the ground, with a glass roof that provides

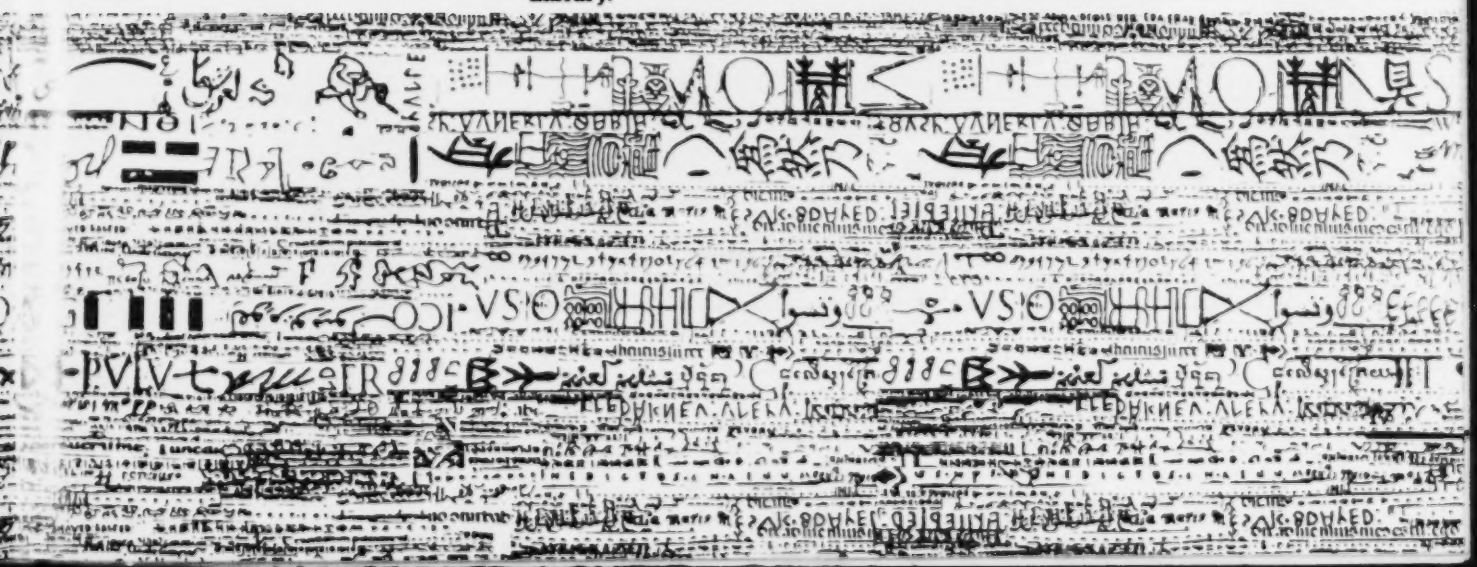
The Bettmann Archive

**An imaginary depiction of the Lighthouse of Alexandria, one of the Seven Wonders of the Ancient World.**

UNDP photo by Lois Jensen

**The beautiful circular harbour of modern-day Alexandria.**

**Detail from the exterior wall of the new Alexandria Library.**



The Bettmann Archive

**Bust of Alexander the Great, founder of Alexandria.**

a view of the harbour and, from the exterior, a visual extension of the sea.

The winner was selected from among 524 entries representing 56 countries. "In conceiving the design, we looked first at the great structures of Egypt, which are defined by the simplicity of their outside form," says Christopher Kapeller, an Austrian architect who worked on the winning project and resides in Los Angeles. The circle, he explains, is symbolic of unity and continuity. It also relates to the sun, one of the most important symbols of Pharaonic Egypt, representing the creative impulse.

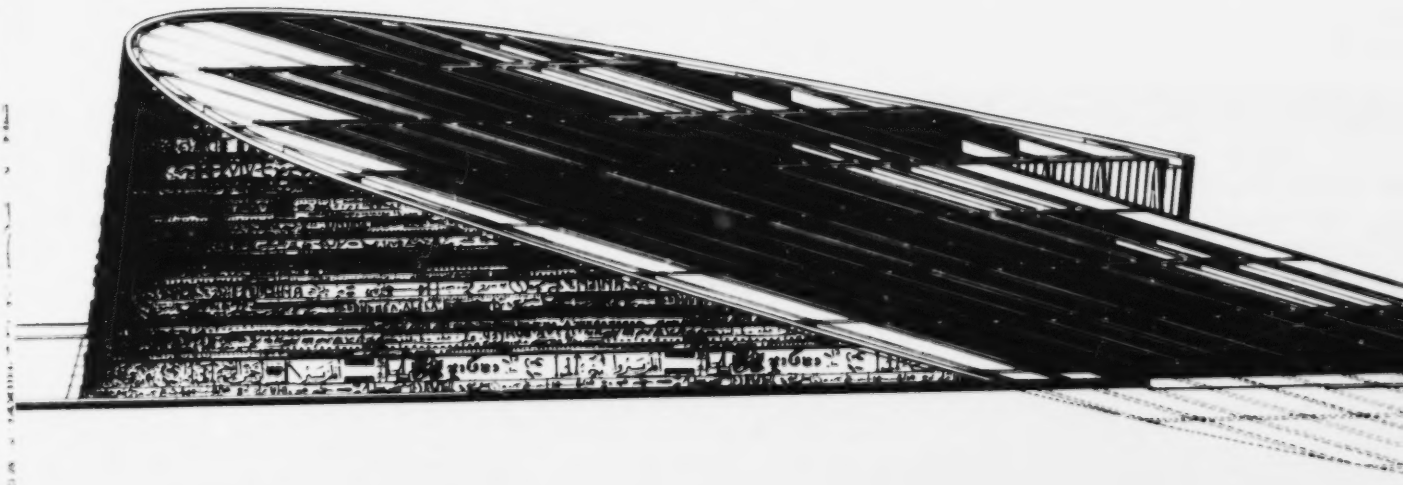
One of the main considerations was the proposed structure's ability to function as a modern library. Hence, the nine-member jury for the competition was made up of three librarians as well as six architects — including John Carl Warnecke of the United States, Fumihiko Maki from Japan and François Lombard from France.

"The ancient Library of Alexandria was known throughout the world for its high standards," says Mr. Warnecke. "We were determined that the same criteria of excellence would be applied in choosing the new design."

One of the main considerations of the jury was the proposed structure's ability to function as a modern library. In aesthetic terms, explains Mr. Warnecke, "we knew nothing about what the ancient library actually looked like, so we had no reference point for the design. Our most important criteria was that it should have a form that fit well into the environment — in this case, an echo of the circular harbour — and a strong symbolic significance. With the winning design we were fortunate in that it didn't fall into any of the many diverse architectural directions or styles today. The design is contemporary, but it transcends style."

For Saleem Kassum, UNDP's acting Resident Representative in Egypt, support for the library falls well within the organization's mandate, despite the more immediate needs of Egypt today, including basic literacy. "One of the fundamental underpinnings of any society is intellectual," says Mr. Kassum. "If you don't develop the intellectual resources of a country or a region, no development efforts can be sustained."

The new library, scheduled for completion in 1995, will be built, like the



original, as a regional centre for scholarship and research, adapted to the 21st Century. An initial collection of 200,000 volumes that will be partly drawn from the municipality's present storehouse of rare manuscripts, is anticipated to grow to eight million. The focus will be the Mediterranean region with an emphasis on the humanities, including the fusion of Greek and Egyptian civilizations, the birth of Coptic Christianity and the influence of Islam. Particular attention will be directed to the history of science and medicine. The new building will also include a planetarium, calligraphy museum, restoration centre for books and manuscripts, and a school for information sciences.

In addition to providing training and other technical assistance, UNDP and UNESCO are supporting an international appeal to fund the library's construction and its collection of books. An estimated US$100 million will be required for the project, in addition to the $80 million in kind already contributed by the Egyptian government.

The new Alexandria Library, which has attracted the personal interest of Egypt's President Mubarak and First Lady, has been accorded the highest political priority. While international response has so far been overwhelming, says Al Sayed Al Gawsaky, Alexandria's Governor, continued enthusiasm will be absolutely essential if this ambitious project is to be realized. "We have an Egyptian saying," he says, "that one hand cannot applaud." ■

**A relief of Cleopatra, an Egyptian Queen and one of the ancient library's most avid supporters.**

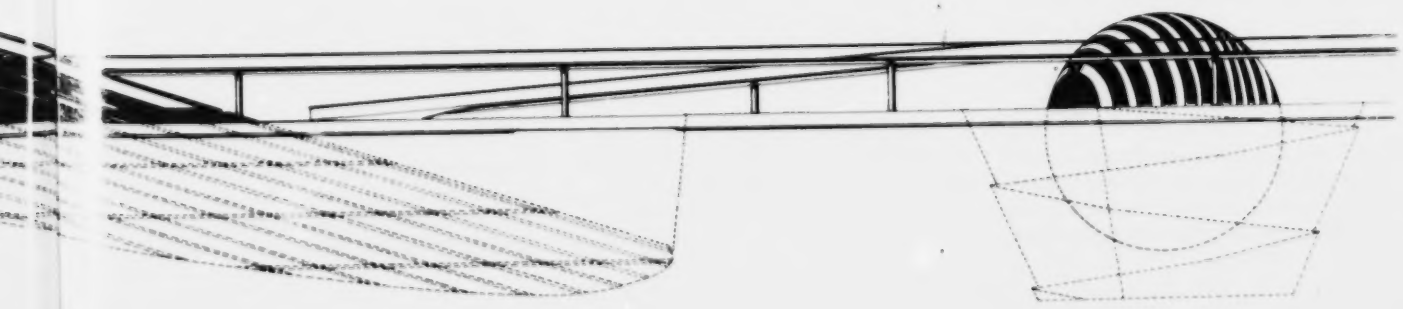
The Bettmann Archive

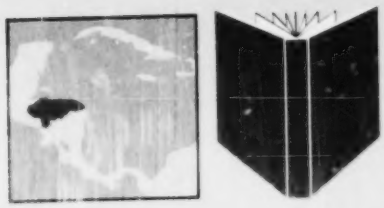
UNDP photo by Lois Jensen

***Top right:***
**Hipparchus, the Greek astronomer who discovered the equinoxes, pictured in the observatory at Alexandria.**

**The international team of Snohetta Arkitektur-Landskap, first prize winners in the library competition, with jury member François Lombard (*far right*).**

**The design of the new Alexandria Library. An external passageway leads to a planetarium (*right*).**





HONDURAS

# Where Even the Children Know the Meaning of Ecology

**By Peter Gall**

**Chagüite Grande, Honduras** — It is late afternoon in this remote mountaintop village, and school is out for Norberto Coronado Andino, a fifth grader. But he remembers his environmental ABCs. "You don't cut trees, you save them," he tells a visitor. "We need them to earn money, for the fresh air and because there would be no water without them."

Forty kilometres away, in El Achiote, Andrés Mesa has continued farming and building a community three years after trees were cleared by the traditional slash and burn method. He used to seek out new forest land every few years. Encouraged by new farming techniques and seed varieties that he has been shown by extension agents, he has terraced the side of hills, sown corn, planted fruit trees and begun agitating for a better road into the village. "We get ideas from elsewhere, but it is self-development," he boasts.

Both Norberto and Mr. Mesa are among thousands of children and adults who have fallen under the influence of ESNACIFOR, Honduras' National School of Forestry Science. The school was founded in 1969 with a grant from the United Nations Development Programme (UNDP), and technical assistance from the Food and Agriculture Organization of the UN (FAO). The college, in Siguatepeque, 130 kilometres northwest of Tegucigalpa, is really a combination of forestry institute, research centre and purveyor of both social and environmental values. It has become such a national institution that it is portrayed on a Honduran 100-Lempira bill.

Its unique value lies in its impact on villages like Chaguite Grande and El Achiote and people like Norberto and Mr. Mesa. In Chaguite Grande, in fact, trees are now felled under a careful management plan after their resin has been collected for shellac and other paint products. The plan also includes an aggressive reforestation programme.

In Chaguite Grande, good conservation and sound agricultural and nutrition values are stressed from an early age. Two years ago, an ESNACIFOR student intern taught the children and their teacher to sow carrots, lettuce, onions and radishes on the slope below the school. The next step was to plant 5,000 pine seedlings in the surrounding woods and teach the children to care for them. The current village teacher continues the practice today.

UNDP photos by Eric Sirtis

**With ESNACIFOR help, trees become a managed, renewable source of income.**

**Children in Chaguite Grande follow ABC's of planting and conserving pine trees.**

It is crucial that Honduras both conserve and exploit its timber industry, since 45 per cent of the land is covered by forest. More than 30 per cent of the Honduran population, or one million people, live in the forest region. They are among the poorest in the country, with an average family income of US$216 a year. Yet only a tiny minority actually make their living from forestry. Most raise livestock, and often cut and burn the forest to provide grazing ground and wood for cooking and heat. The resulting loss of ground cover and increased erosion only makes the livelihood of forest dwellers more precarious. But since their needs are so immediate, long-term forestry projects held little interest for them. This is a prime educational challenge for Honduras, and for ESNACIFOR in particular.

According to Rubén Guevara, director of ESNACIFOR, the government originally established the institute with the aim of graduating forest rangers. In 1974 it was turned over to the newly formed, semi-autonomous Honduran Corporation of Forestry Development known as COHDEFOR. Its forestry graduates spend three years learning both the practical lessons of a forest ranger and the training needed to help people farm, build a sawmill or grade and sell timber.

Eventually, the school's focus on trees broadened to take in the people who live and work in and near the forests. In 1984, ESNACIFOR began to teach students to be rural teachers imparting environmental education. Today, extension agents trained at the school are targeting some 80,000 farmers around the country for help in tying their agriculture in with forestry. They are also receiving training in fighting forest fires, in organizing themselves to obtain clinics, clean water and schools from state bureaucracies, and in getting women more involved in the development process.

ESNACIFOR's success as a school bridging the nation's natural and human resources makes it a key player in a new COHDEFOR programme begun in early 1989 with the support of UNDP and the Dutch government. The initiative — to strengthen Honduras' "Social Forestry System" — will concentrate on 38 poor communities that are drawing their living from the forest.

The new initiative will try to build on the experience gained in Chaguite Grande and in El Achiote. The aim is not only to assist forest dwellers to boost their incomes from timber, but to help them see the reasons to conserve and manage the forest so it will serve them for years to come. Revolving loan funds are a key element in trying to turn poor forest workers into owners or members of co-operatives managing small forest-based businesses, whether it be in timber or environmentally sound cattle raising.

ESNACIFOR's role is to prepare much of the audio-visual and other teaching materials necessary to communicate clearly to the target audience. The college will also train extension agents to combine traditional forestry management with the economic and social requirements of the 38 communities.

Now the National School of Forestry Sciences has 72 full-time students from Honduras and neighbouring countries and trains 1,500 other forest-related workers and experts. It has grown from what Rubén Guevara calls "an ugly little outfit" in the town of Siguatepeque in the early 1970s to a campus of 25 buildings on its own spacious, forested grounds. But its lasting value, says Mr. Guevara, will be measured by what it can do to strengthen the Social Forestry System and to act as an agent for long-lasting change among the people of the Honduran forest. ■

## By Holly A. Ornstein

**Ulaanbaatar, Mongolia** — In Mongolia, summers are short, hot and dry, and winters long and cruelly cold. Mongolians are also accustomed to enduring their neighbours. While they ruled much of Asia and the Near East in the 13th century under the dynasty of the legendary Genghis Khan, they have spent most of the last two centuries contending first with Chinese and then with Russian dominance. Until the advent of *glasnost* two years ago, it was against the law to speak of Genghis Khan.

Today, change is in the air, and the big news is that the Russians are going home. With the thaw in Soviet-Chinese relations, Moscow no longer views Mongolia as a vital military buffer along the Chinese border. As a consequence, 50,000 Soviet troops have been recalled, according to the Mongolian Foreign Ministry, 75 per cent have departed. Moscow has also said that it can no longer afford to subsidize the country's economy, and intends to withdraw some 50,000 Russian technicians, teachers and government advisors within the next two years. A majority of them, according to the Mongolian government, have already gone.

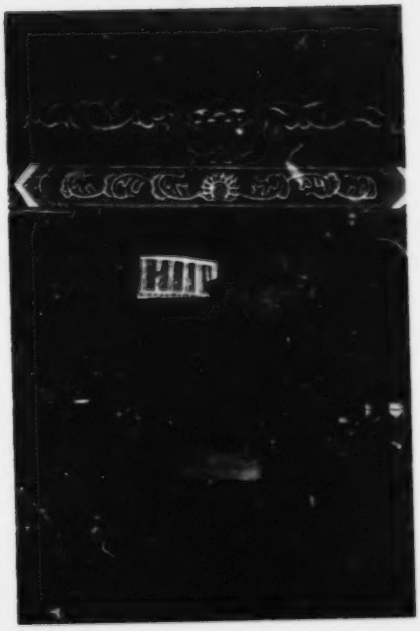
Now, after 65 years of Soviet help in trying to modernize the country, the Mongolians are on their own. While rich in oil, minerals, livestock, lumber and wool, the nation is critically short of machinery, manpower and hard currency. "We are up to our ears in debt to the Soviet Union," says one trade official, "and that locks us into shipping goods like ores, cashmere and meat to Moscow and the socialist bloc countries that make up *Comecon*."

**Nomadic herdsman rounding up sheep in Central Mongolia.**

**High-rise apartments in the capital feature playgrounds for the country's most prized asset.**

Photos by Nancy Burson

**Tourists in the Gobi Desert sleep in *gers*, much as nomadic herders have for centuries.**

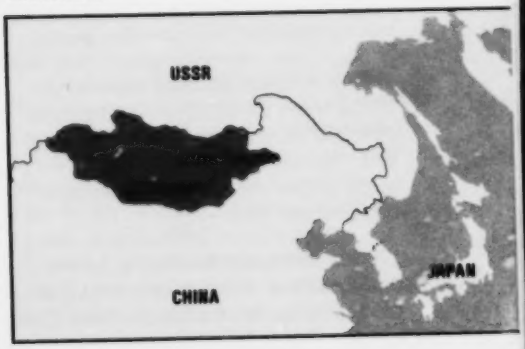



**A man dressed in the traditional *del* buys a bus ticket in Ulaanbaatar.**

Each year Mongolia exports products worth only two billion *tugriks* — US$600 million — but imports $800 million worth of goods from the Soviet Union, says J. Hanibal, who heads the Soviet Affairs Department of Mongolia's Ministry of Foreign Affairs.

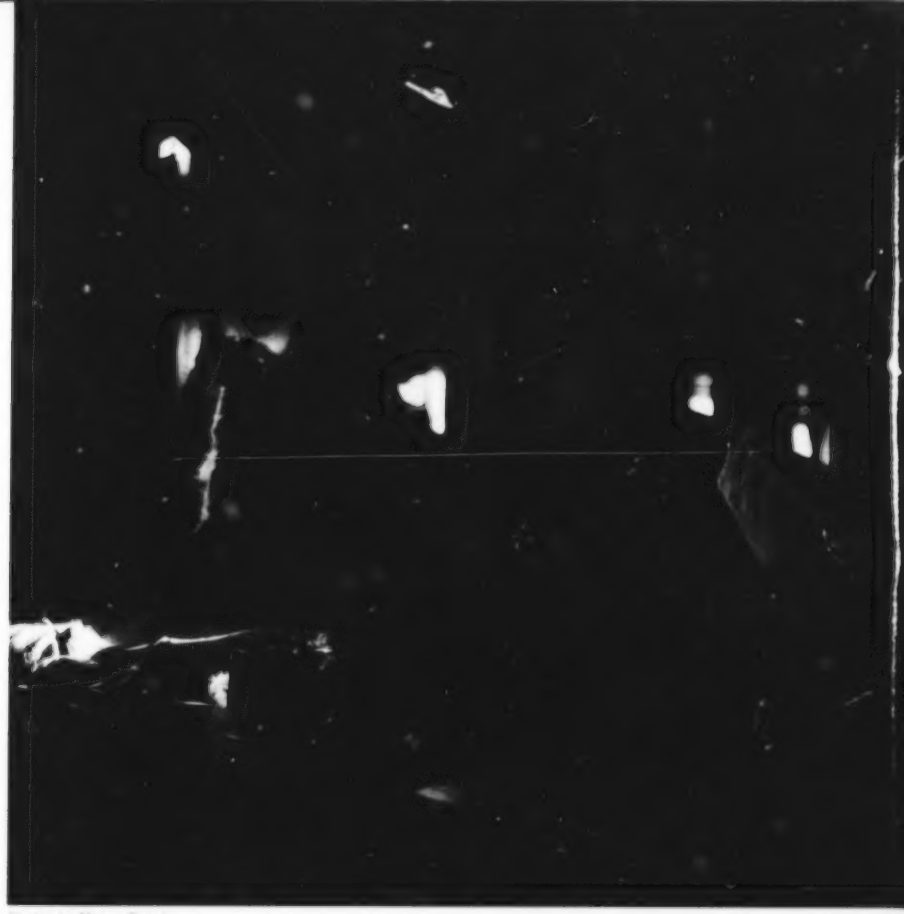
Mongolia is determined to trade with the west, but geography is a huge obstacle. Landlocked, surrounded by China and the Soviet Union, it is expensive to transport the nation's products beyond its immediate neighbours. The nation's isolation inspires a wry sense of humour. When asked his biggest wish, a 32-year-old government official quipped, "I wish Mongolia would move to a seaboard."

One obvious option is to start shipping finished goods, which are cheaper to transport than raw materials like coal and timber. Finished goods also earn more. But there is an ironic catch: Mongolia needs to earn hard currency to purchase the latest machinery to develop its own products — but has little to exchange other than its raw materials.




The United Nations Development Programme (UNDP) is helping to break this cycle. From 1987 to 1991, it has committed $5.5 million to help 15 Mongolian enterprises develop projects from spinning wool to manufacturing high-priced pharmaceuticals based on enzymes drawn from the nation's abundant livestock.

Such projects make sense in a country of only two million people that has 23 million horses, camels, cattle and sheep. Before most Mongolians learn to



Photos by Nancy Burnie

walk, they've begun to learn to ride the country's stocky horses.

In fact, throughout the country, the only things more noticeable than the animals are the colours — Mongolians have painted bright Chinese geometrics on almost every fence and wall in the cities. In the countryside, the doors of their sheepskin-covered tents — called *gers* — are painted brilliant colours. Here in the capital, the spacious squares and small parks are filled with citizens wearing such colourful costumes they seem to create a moving palette.

And then there are the children. There's a huge push to repopulate Mongolia. Over the centuries, birth rates stayed low as the most able of the male population became Buddhist lamas — who were celibate. Population growth received another blow in the 1930s when all but three of the country's 750 monasteries were destroyed and 100,000 lamas were killed — some 40 per cent of the male population at the time.

With Mongolia still facing a manpower shortage, the government has made babies the country's new status symbol. Each child brings a generous tax break and mothers with eight or more offspring earn the "first class medal of famous mother award."

It will take a while before the country catches up with its planned population explosion. With 70 per cent of Mongolians younger than 30, there are mounting strains on the education system. And in the cities, where housing and fuel shortages are acute because of the shift toward urbanization, the government is hard pressed to meet the expectations of the mobile young.

In the past 30 years, Ulaanbaatar's population has tripled. In the rural areas, some 50 per cent of the population, most of them nomads, have left to work in the cities. Many have found positions in the government's swollen bureaucracy. Those who have stayed behind either farm collectively or live as herders in the Gobi desert and plains in the south, or in the mountains and forests that ring the country.

City grocery stores are stocked to the rafters with cabbage, heavy wheat bread and candy — the Mongolians serve mounds of sweets to their visitors. But for all the cattle and sheep in this country, there are often long lines to buy milk and meat. One reason is the poor state of the roads from the countryside and a shortage of refrigerated trucks.

"Sometimes the meat comes in too late from the countryside and it's spoiled," says T. Baatar, a director with the Academy of Science. And a lot of what does get shipped to town is promptly exported to the Soviet Union in exchange for desperately needed oil. While Soviet and British geologists have found crude oil deposits in Mongolia, the government has yet to build its own refinery — a matter of top priority.

Petrol is rationed and shipments from the Soviet Union are so erratic that sometimes only government vehicles can function. Housing poses another challenge. Half of the city's residents live in cramped Soviet-styled apartment complexes. One 30-year-old government worker lives with his mother, brother, wife and two children squeezed into one main room with only a small kitchen and bathroom.

Within a three-minute walk from the city's modern 15-storey office and apartment buildings are clusters of traditional tent homes which house the other half of the urban population. Most of the cream-coloured cylindrical tents with brightly painted doors have electricity, but inhabitants collect water from a common pump.

Although such tent districts are permanent, most *gers* can be taken apart in about 20 minutes. Some city-dwellers, however, are losing their traditional touch. One government statistician remembers setting out with her

**The Gandan Monastery in Ulaanbaatar is the nation's only active Buddhist temple.**

**Palace of Bogd-Gegeden, former home of Mongolia's spiritual leader.**

**Waiting for the bus in Ulaanbaatar.**

family for the countryside, intending to spend the summer in a *ger*. "We couldn't figure out how to put it together," she recalls. "We ended up coming back to the city after just a day." Out in the countryside, herders still fold their *gers* and move everything they own by truck or on pack horses about five times a year in order to reach new grazing lands.

During the centuries their country was a province of China, most Mongolians were nomads. In 1912, the territory was briefly an autonomous state under Russian protection, until the Chinese wrested back control in 1919. Within two years a revolutionary government came to power with Soviet backing, and three years later, the Mongolian People's Republic was proclaimed.

Throughout the period of Chinese and Soviet dominance, the Mongolians have maintained enormous national pride. They value their past and have preserved their traditional clothing, music and song. And in the last two years, encouraged by reforms in Moscow, a new openness about both the future and the past is sweeping the steppes of this mystical land.

Buddhism is re-emerging, and the old Mongolian script is once again being taught. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is helping restore four Buddhist monasteries. For the first time since the 1920s, it is safe to speak openly of the empire of Genghis Khan. In fact, the life of the great warrior-leader who unified the region's various nomadic tribes will soon be the subject of a government documentary and a newly commissioned classical ballet. And in a major bid to boost foreign

**L. Chuluunbat directs a UNDP-backed project producing pigments.**

**The new Genghis Khan Hotel is designed to promote tourism.**

**Better forecasting will help farmers and herders cope with volatile weather conditions.**

tourism, an ultra-modern hotel -- The Genghis Khan — is scheduled to open in Ulaanbaatar in 1991.

The government has launched its own version of *perestroika*. In Mongolia it is called *shinechlel*. Officials talk of building new economic and legal systems. A joint venture law is expected to be inaugurated by the end of the year. There is talk that in the Presidential election this June, there may be more than one candidate. Farmers in some collectives can now own up to 75 livestock and for the first time. English is being taught in some schools to children above the seventh grade.

But as the Mongolians search for a new identity within a world context, they are well aware of major limitations. The country's isolation and poor infrastructure — only 900 kms of its 40,000 kms of road are paved — has made progress particularly arduous.

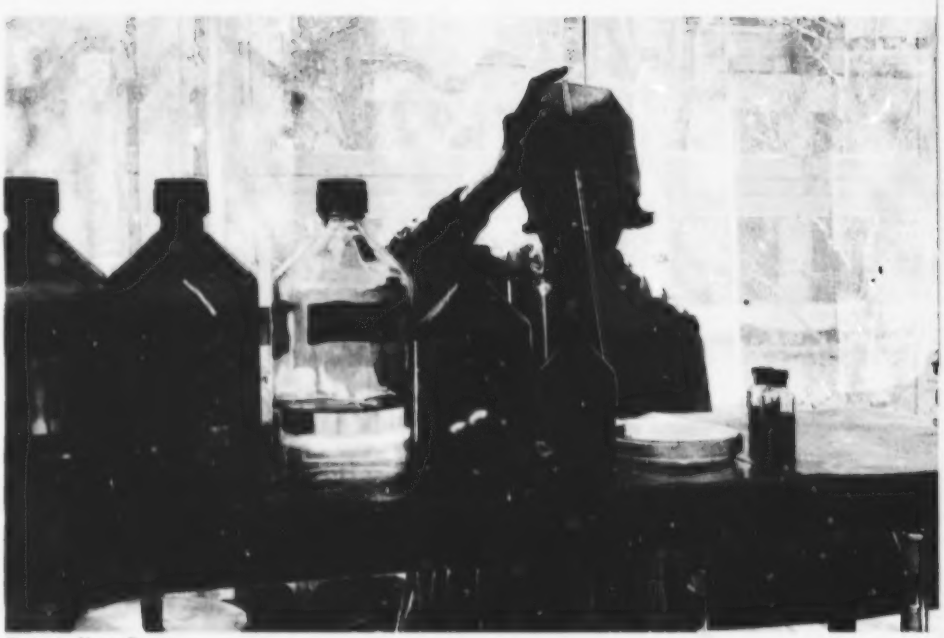
As Soviet assistance wanes, UNDP is playing a key role in funding projects that the government considers fundamental to diversified growth. In Ulaanbaatar, a cashmere and camel wool processing factory built with $2.3 million of assistance from UNDP in 1976 has been recently expanded to produce over 60,000 cashmere sweaters and 1,000 scarves each year. Massive machines in the plant's bottom floor churn out the wool that is later spun mechanically into yarn. Upstairs, 35 Mongolian women produce the bright sweaters, nearly all of which will be exported.

Another UNDP-assisted project, for the production of enzymes, is similarly tapping into existing resources. In his office filled with medical books, D. Tserendenden, director of the project, discusses his plans over the requisite cup of coffee and Mongolian sweets. He explains that thanks to an investment of $800,000 from the UNDP — $500,000 for equipment, $300,000 for fellowships and export expansion — a plant has been built that each year packages $1.7 million worth of enzymes removed from the pancreas of goats, cows and horses.

Pancypsinum, extracted from small cattle, is mixed with lanolin and applied as an ointment for severe burns and open wounds. It is also used in a serum to clear arteries and treat certain blood-related diseases. The ointment was widely distributed by the Soviet Union to the victims of the Chernobyl nuclear plant disaster and the Armenian earthquake. While production is limited, there is growing demand for the enzymes from as far away as Switzerland. A new plant with greater capacity should be completed in 1991.

Yet another $2.2 million UNDP project, which is tapping power from the sun, wind and bio-gases, is now supplying energy in rural areas where only ten per cent of the nomads have electricity. A $1.2 million UNDP-funded project is helping Mongolian meteorologists collect and analyze data to improve weather forecasting. In a move to help promote new international air routes, UNDP has just agreed to provide $1.4 million for new navigation aids and the teaching of English to Mongolian pilots and air controllers.

Such projects are part of UNDP's overall strategy to help the country overcome its geographic isolation, exploit its resources, increase its skilled manpower and expand its export potential. The determination of the Mongolians should help. "We are warriors by tradition," says Z. Choinkhor, head of the Asian Department in the Ministry of Foreign Affairs. "Although most people have heard of our country and of Genghis Khan, we want to be known for our fine products." ■



Photos by Nancy Burski

**Enzymes are extracted from animals to produce high priced pharmaceuticals.**

*Writer Holly A. Ornstein and photographer Nancy Burski, reported this story while on holiday in Mongolia. Both work for The New York Times.*

BUSINESS

# Tonga Tunes Up Its Economy

By Cherie Hart

**Nuku'alofa, Tonga** — Just west of the International Dateline, the Kingdom of Tonga is the first country in the world to greet each new day. Seemingly confused by the Dateline, the local roosters crow constantly just to be sure. As if balancing between yesterday and today, Polynesia's oldest and last remaining monarchy is re-examining its fragile economy, forcing the old to make way for the new.

"This is an important time of change for us," says Tonga's King Taufa'ahau Tupou IV. "We are trying to export more and shift our economic base from agriculture to small industry. The world is opening up to us and we are opening up to the world."

Something had to be done in a country where imports are five times higher than exports. Remittances from Tongans working outside the kingdom dropped dramatically last year, and tough new quarantine restrictions in New Zealand all but killed the valuable banana and watermelon trade. Tonga has staved off an extreme financial crisis through foreign aid and remittances, which covered the US$46 million deficit in 1988.

While agricultural production declined by ten per cent in 1988, mainly due to drought, manufactured products are on the rise. In 1988, they accounted for 18 per cent, or $1.2 million of the total export of goods. These results are hailed by officials as a mark of success in the government's bid to foster small and light industries throughout this country of only 100,000 people.

The economy of Tonga remains largely agricultural under the feudal land system, dating back to the mid-19th Century when the country's first king took the throne. Essentially, all land is property of the crown, but every male Tongan over the age of 16 is entitled to an allotment. Since there is no longer enough land to go around, extended families share plots. For centuries, most of the population survived on subsistence agriculture and fishing.

Given this restrictive system of land use, it made sense for the government to undertake aggressive steps to encourage new business. Tax holidays, low interest loans, and exemptions on certain export and customs duties are among the incentives offered to both local and foreign entrepreneurs who have the requisite know-how and initiative. The United Nations Development Programme (UNDP) has helped to promote small and medium scale industries in both rural and urban areas. Over the past two years, 40 new businesses have sprung up through the $350,000 UNDP-financed project.

"We guide anybody and everybody who wants to start a business or expand one in Tonga," says Desh Sahae, Chief Technical Adviser for the project, which is carried out by the United Nations Industrial Development Organization (UNIDO). Mr. Sahae helps budding entrepreneurs write business proposals and locate financing. In the case of businessmen who want to expand existing enterprises, he makes them aware of all the duty exemptions and port and service tax concessions that they are entitled to.

"This modest project is creating jobs, introducing skills not there before and bringing necessary know-how to the country," says Nigel Ringrose, UNDP Resident Representative in Fiji. "If it can work in the middle of the Pacific Ocean, we feel it can work anywhere."

For Frank Cowley, owner of Tonga's

**TONGA**

UNDP photos by Cherie Hart

**Royal workout for Tonga's King Taufa'ahau Tupou, escorted by aides.**

**Improved production at this furniture factory has doubled profits.**

oldest bakery, customs duty exemptions enabled him to trade in a century-old woodburning oven for modern oil-fueled ones from Australia. With a new molder, conveyor and mixer, bread production at Cowley's Bakery has increased by 50 per cent. Mr. Cowley saved $11,250 in duties and was able to get a low-interest loan from the Tongan Development Bank.

More than 130 entrepreneurs have attended UNDP-supported seminars on investment opportunities in Tonga. Through a seminar two years ago, Una Tupou learned how to find funding for expansion of Vete Motors, her brother's automobile spare parts shop. Today, the shop has expanded to include auto servicing, electronic repairs and car rentals. A year after Mrs. Tupou attended her first seminar, profits from the repair shop topped $30,000 — 30 times Tonga's per capita GDP.

Foreign businesses wanting to invest in Tonga have their own share of challenges. Under the ancient land tenure system, real estate is at a premium on Tonga's 36 inhabited islands. Foreigners are virtually prohibited from purchasing property.

Through guidance from project-funded experts, foreign investors can learn about real estate options and obtain legal advice on leasing. One popular choice is to rent space at the Small Industries Centre, an industrial estate on the outskirts of Nuku'alofa, Tonga's capital on the main island of Tongatapu. Twenty-four businesses, mostly foreign or joint ventures, currently enjoy the inexpensive rent, water and electricity offered at the centre. By employing nearly 500 workers in such industries as knitwear, sport equipment, refrigerator manufacturing, jewelry making, and processed fruit production and canning, the centre also helps to alleviate the country's unemployment problem.

Short-term consultants are brought in to advise specific industries on their particular production problems. Six experts in the fields of garment manufacturing, furniture production and agriculture were flown to Tonga with UNDP funds last year.

"The consultant taught us how to make jigs for mass production, rather than continue to produce everything by hand," says Carl Sanft, owner of a 17-employee furniture manufacturing company in Tonga. "He also showed me better techniques for book keeping, cost-price analysis and stock control."

Despite such success stories, the country's economy remains frail. The annual report of the Bank of Tonga warns that any sudden decline in foreign aid or further drop in remittances could lead to recession and an acute balance of payments deficit. Determined to counteract these forces, Tonga is struggling to invest in industries which are most likely to succeed. The future of agricultural development is also under urgent review. The Kingdom of Tonga is in a tight race against time. ■

# It's Time to Help the "Invisible Revolution"

***"Speaking Out" is open to readers who wish to offer clear, well-supported positions on development issues. The column is inaugurated by Mario Vargas Llosa, the Peruvian novelist who is a candidate for President of his country. The views expressed in this column do not necessarily reflect those of UNDP.***

**By Mario Vargas Llosa**

In most least developed countries, the "informal economy" is usually thought of as a problem: clandestine, unregistered, companies that pay no taxes, that compete unfairly with companies that obey the law and pay their taxes promptly.

That kind of thinking is totally erroneous. In countries like Peru, the problem is not with the unregistered entrepreneurs but the state itself. The informal economy is the people's creative response to the state's incapacity to satisfy the basic needs of the impoverished masses. When legality is available only to those with political and economic power, those excluded — the poor — have no alternative but illegality. This is why the informal economy comes into being, as Hernando de Soto amply demonstrates in his book *The Other Path*. The title is a challenge to the Shining Path movement that sprang up in the Andes in 1980 and proclaimed a Maoist utopia.

To discover what the "cost of legality" is in Peru, the Institute for Liberty and Democracy set up a fictitious clothing factory and went through the procedure — the bureaucratic maze — of establishing it legally. The institute decided to pay no bribes — except when not paying them would bring the entire process to a standstill. To register the imaginary factory took 289 days and cost US$ 1,231, including expenses and lost wages and two bribes. At that time — summer 1983 — the amount was the equivalent of 32 minimum monthly wages.

If setting up a legal shop is a costly and time-consuming task for the poor, it is even more difficult for them to obtain legal housing. The Institute found out that if a group of low-income families petitioned the state to cede them a vacant lot on which they might build, they would have to work their way for six years and eleven months through ministries and municipal offices and spend approximately $2,156 per person. Even to get a license to open a street kiosk or sell from a pushcart is a task of Kafkaesque proportions: forty-three days of commuting between bureaucrats at a cost of $590.56 — 15 times the minimum monthly wage. No wonder the underground economy flourishes.

In Lima alone, the underground entrepreneurs (excluding manufacturing) employ 439,000 people. Of the 331

Helene Bamberger/Gamma-Liaison

**Mario Vargas Llosa**

markets in the city, 274 (83 per cent) have been built by the unregistered contractors. Ninety-five per cent of the city's public transport belongs to clandestine businessmen who have invested more than a billion dollars in vehicles and vehicle maintenance. As to housing, half the population of Lima lives in homes built by underground contractors.

One of the most widely accepted myths about Latin America is that its backwardness results from economic liberalism, making us easy prey for voracious imperialists and fostering internal inequities between the rich and poor. The Institute's thesis is that Peru never had a market economy, and that it is only now, because of the underground market, beginning to get one — a savage market economy, but a market economy nevertheless.

The same applies to all of Latin America and probably to the majority of Third World nations. Economic freedom is a principle emblazoned in our constitutions that has no more reality than the principle of political freedom, to which our politicians render hypocritical tribute. De Soto calls our economic system, which has been masquerading as a market economy for generations, mercantilist. Here, "mercantilism" means a bureaucratized state that confers monopolies or favoured status to a small elite that depends on the state and on which the state is itself dependent.

The entrenched entrepreneurial class, instead of favouring an egalitarian and dynamic system in which the law would guarantee free competition and reward creativity, has adapted itself to the mercantile system and dedicated its best efforts to obtaining monopolies, often through corruption and supported [illegible]s that mock the most elementar[illegible]ocratic practices. Hernando de Soto's study shows that only one per cent of our laws emanate from the body created to make them: the Parliament. The other 99 per cent flow from government departments with no debate and often without the knowledge of those affected by them. The informal economy is the masses' response to a system that has made them victims of a kind of legal and economic apartheid.

*The Other Path* does not idealize the informal market. On the contrary, de Soto describes the limitations that living outside the law imposes on informal businesses, and shows that many of the underground entrepreneurs earnestly desire legality. But the study, while being realistic about the informal economy, does allow us a glimpse of the clandestine businessman's spirit and imagination. It shows us what might be hoped for if all that productive energy could be put into practice legally in an authentic market economy involving a government which, instead of harassing underground entrepreneurs, would protect and stimulate them. ■

---

*Peruvian author Mario Vargas Llosa contributed the foreword to "The Other Path," (Harper & Row) from which this article is excerpted. Copyright (c) 1989 by Hernando de Soto.*

# Putting it All Together

Teaching women to read in Yemen.
Fighting river blindness in Africa.
Testing handpumps worldwide.
Protecting tropical forests.
Starting a newspaper in Bhutan.
Joining international action against AIDS.
Planning a city in Cyprus.
Building roads in Burkina Faso.
Dealing with debt in Costa Rica.
Restoring artifacts in Ecuador.
Stabilizing soil in the Sudan.
Helping nations work together.

undp **World Development**

United Nations Development Programme
One UN Plaza, New York, NY 10017

Offices in 112 developing countries.